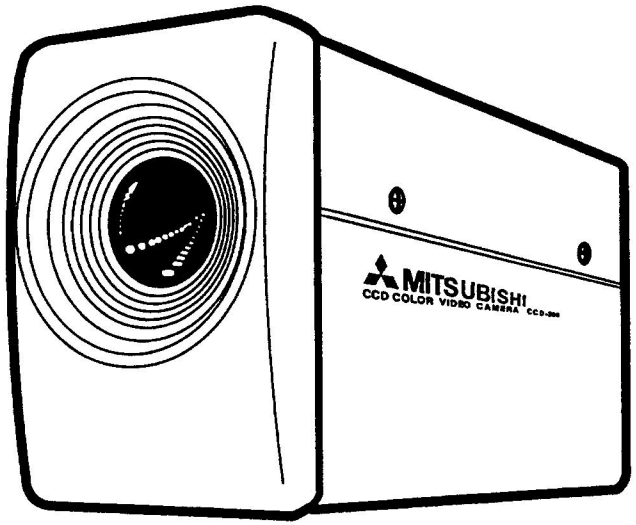
MITSUBISHI

COLOUR VIDEO CAMERA

CCD-300E

OPERATION MANUAL



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Accessories

- BNC coaxial connector 1 (set)
- Operation manual 1
- Clamp and screw 1 (set)

1. Instructions Before Use

Power Supply

■Only connect this camera to its exclusive adapter, DA-100E.
(Use power supply of DC12V$^{+2}_{0}$V, with a ripple voltage less than 500mVp-p.)

Handling

■Do not take the camera apart.
■Do not spill liquids into the inside of camera.
■Do not touch the lens.

Utilization and Storage

■Do not store or operate the camera under the following conditions:
- Extremely hot or cold environment (operational temperature: 0°C - 40°C).
- High humidity or dusty environment.
- In inclement weather.
- Under severe vibrations.
- In the vicinity of TV or radio.

■Keep this camera away from direct sunlight or bright light.

Care and Handling

■Clear dust on the lens with a blower.
■Wipe off stains on the case with a dry cloth.
To remove dirt, clean with a non-abrasive detergent and wipe dry.

CAUTION:

- Some parts of this camera are made of plastic. Wiping it with benzine or thinner, putting a rubber or vinyl product against it, or spilling volatile liquids on it such as insecticides may cause deterioration of parts and flaking of paint.
Read the instructions before using a chemical duster.

Interference

■Operation of camera in the vicinity of a TV or radio, motor or transformer having a strong magnetic field will cause distortion of the picture.
To reduce interference, protect the camera cable from magnetism by putting it through a metal conduit. When using more than one camera, connect each camera cable through a metal conduit.

Camera Malfunction

■If the camera makes an unusual noise, smokes, or emits an unusual odour, immediately unplug the camera and take it to an authorized servicer.

2. Features

This Colour Video Camera incorporates a 1/3" CCD which contains approximately 440,000 effective pixels, an auto focus function, and a built-in eight-power zoom lens. All these functions can be controlled by using the personal computer equipped with the RS-232C connector and make the camera attractive in such applications as television conference and observation.

- **A built-in RS-232C interface**

  can control the functions such as zoom, focus, detail, shutter speed, backlight compensation, gain, white balance, brightness, iris, colour and phase.

- **A built-in electrically powered eight-power zoom lens**

  Zoom in on a subject at any time.

- **Full-range auto focus function**

  Focus ranges from "macro" (the shortest distance between the object and the camera is 1 cm at the widest angle.) to "telephoto" by sending AUTO FOCUS command.

- **High resolution**

  The CCD containing about 440,000 effective pixels which will reproduce exceptionally fine pictures with 430 horizontal TV lines.
  In addition to standard composite video a separate Y/C output is provided.

- **Auto white balance function**

  automatically compensates for colour temperature variations of light so that white is reproduced as white.

- **High speed electronic shutter**

  enables you to select the most suitable shutter speed ranging from 1/50 to 1/10000 (7 steps).

- **Camera ID display**

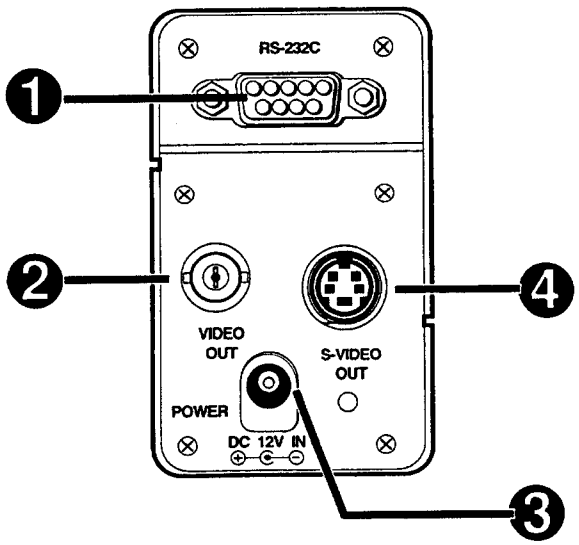
  can superimpose the camera ID (8 figures of alphabetical or numerical characters) over the video signal.

- **Preset function**

  can preset 10 ways of the state for 8 functions such as white balance, shutter speed, zoom, focus position, backlight compensation, iris, brightness and gain.

3. Names And Functions

REAR VIEW



❶ RS-232C terminal (D-SUB 9 pin)

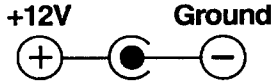
This is an input and output terminal for control signals for each function.

❷ VIDEO OUT terminal (BNC type)

This is an output terminal for composite video signals.

❸ DC 12V IN terminal (Φ5.5 DC jack)

This is an input terminal for DC12V$^{+2}_{0}$V power supply. (ripple voltage less than 500mVp-p)
The following are the polarities:



NOTE:

- Do not connect the plug different than above (especially the plug with the opposite polarity.)

❹ S-VIDEO OUT terminal

This is an output terminal for separate Y/C video signals.

Functions

(1) WHITE BALANCE

Set the WHITE BALANCE according to the type of light.

AUTO: White balance is adjusted automatically.
LOCK: White balance is locked to the value set by W-BALANCE LOCK.
OUTDOOR: White balance is locked to the outdoor mode.
INDOOR: White balance is locked to the indoor mode.

- The default setting is "AUTO".

(2) W. BALANCE LOCK

Set the W. BALANCE LOCK according to the colour temperature of the light.

- The default setting is "UNLOCKED".

(3) SHUTTER SPEED

Shutter speed can be set to the following 7 steps.

NORMAL (1/50), 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/10000

- The default setting is "NORMAL".

(4) CAMERA ID

CAMERA ID No. can be set to 8 figures of alphabetical or numerical characters.

- The default setting is not indicated.

(5) ZOOM

MANUAL ZOOM: The picture can be manually zoomed between TELE side and WIDE side. (There are two modes : High speed and Low speed.)
PRESET ZOOM: When preset, the picture is zoomed up or back to the preset position by calling the preset No. (This function operates only in high speed.)
ZOOM SPEED: Operating speed from the WIDE limit to the TELE limit,
High speed : 4 sec.
Low speed : 7 sec.

(6) FOCUS

AUTO FOCUS: Focus is automatically adjusted to the centre object in the image.
MANUAL FOCUS: The focus position can be manually adjusted to optimize focus on the subject material.
PRESET FOCUS: When preset, the focus is moved to the preset position by calling the preset No.

NOTE:
In this Operation Manual, "TELE" means "telephoto" and "WIDE" means "wide angle".

(7) IMAGE ADJUSTMENT

① IRIS
Controls AUTO IRIS LEVEL.

② BRIGHT
Controls the bright level of the image on screen.

③ DETAIL
Adjusts the contour of the image.

④ COLOR
Determines the intensity of the colour.

⑤ TINT
Adjusts the proportion of red to green that determines the delicate tones of colour.

⑥ BACK LIGHT
Controls the level of black in the picture at backlight.

⑦ GAIN
Controls the AUTO GAIN CONTROL LEVEL at low illuminance.

By setting the above items, the effects shown below can be obtained.

Adjusting item \ value	-30 ⟵	⟶ +30
IRIS	Darker	Brighter
BRIGHT	Darker	Brighter
DETAIL	Soft	Sharp
COLOR	Light	Deep
TINT	Add red	Add green
BACK LIGHT	Darker	Brighter
GAIN	Low	High

- The default settings are "0".

(8) PRESET

can memorize 10 preset adjustments for the following functions and execute it.

IRIS, BRIGHT, BACK LIGHT, GAIN, WHITE BALANCE, SHUTTER SPEED, ZOOM, FOCUS

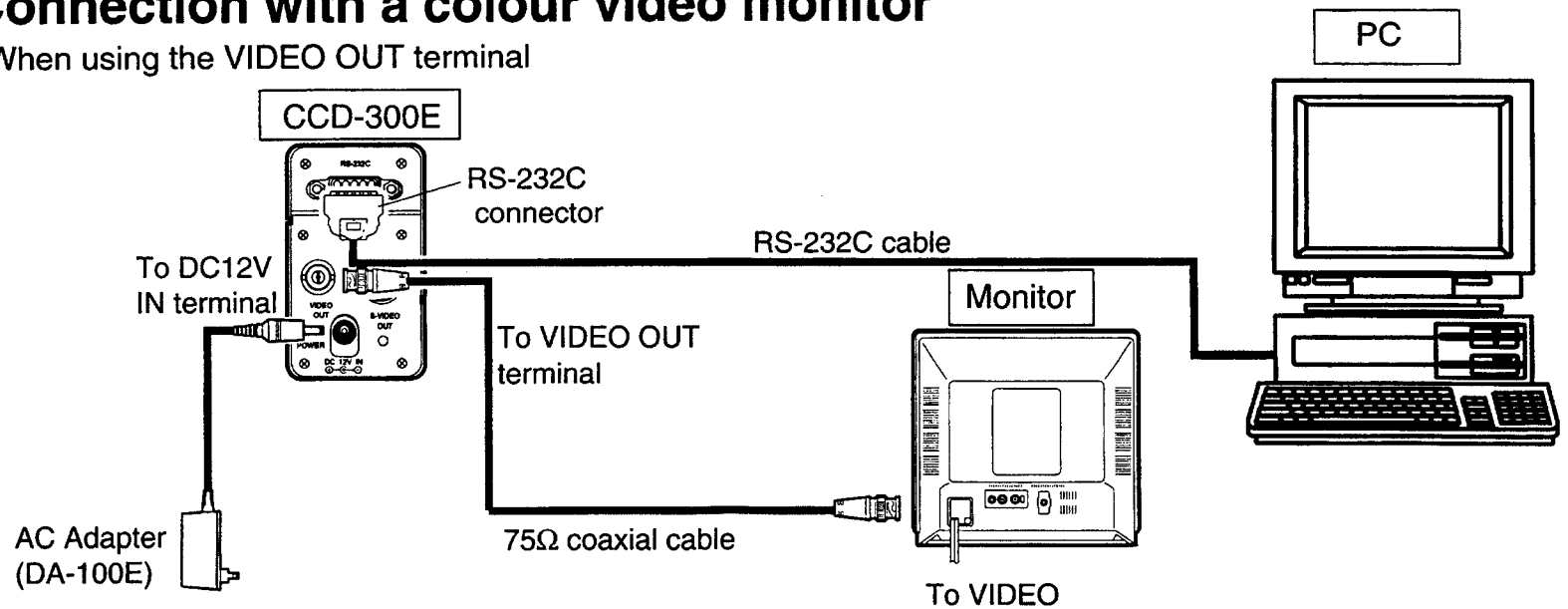
NOTE:

- If no command has been sent with the Menu screen displayed for about 30 seconds, the normal screen returns.
- Try to maintain at least a 1cm working distance when imaging at the widest angle and at least 80 cm when imaging at the telephoto end.
- The picture may go out of focus if the ZOOM button is pressed. In this case, adjust the focus of the camera by sending AUTO FOCUS command.
- The set view angle and focus will be consistent until settings are changed.
- When the picture is shot with the electronic shutter under fluorescent lamps, etc., the colouration may change or the screen may be brighter or darker.

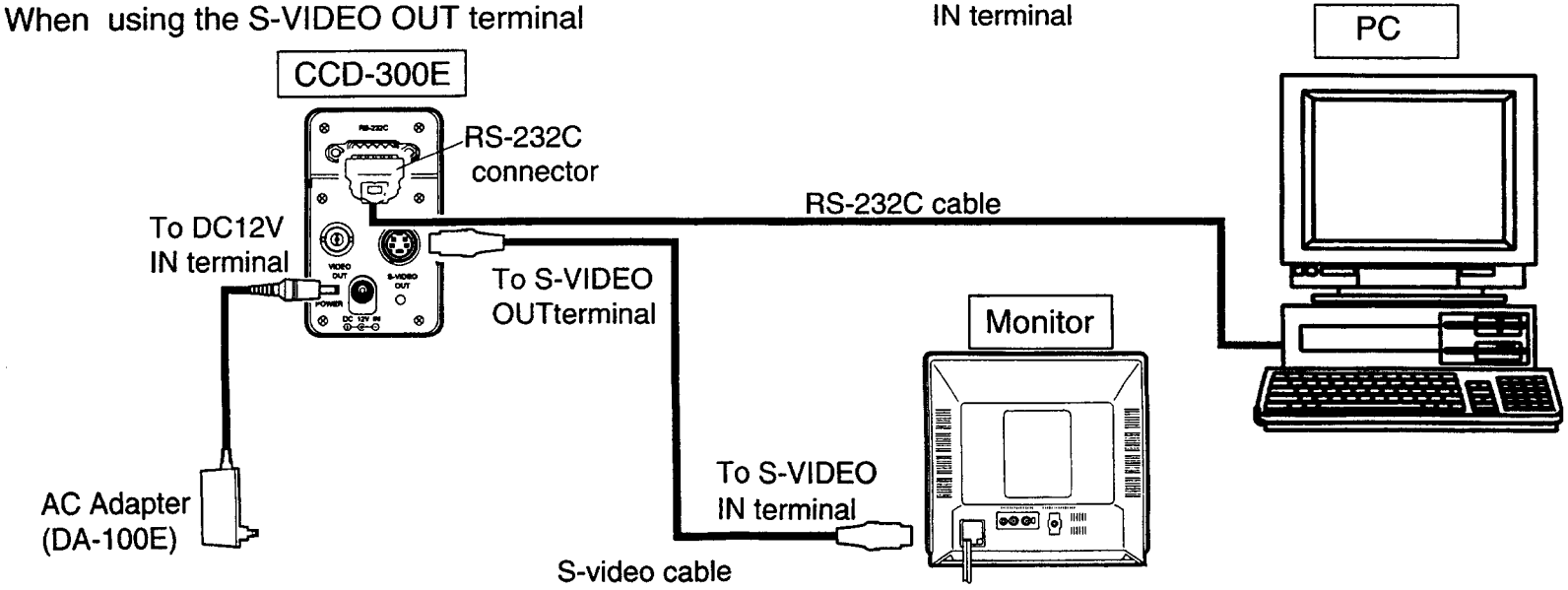
4. Connections

1. Connection with a colour video monitor

■ When using the VIDEO OUT terminal

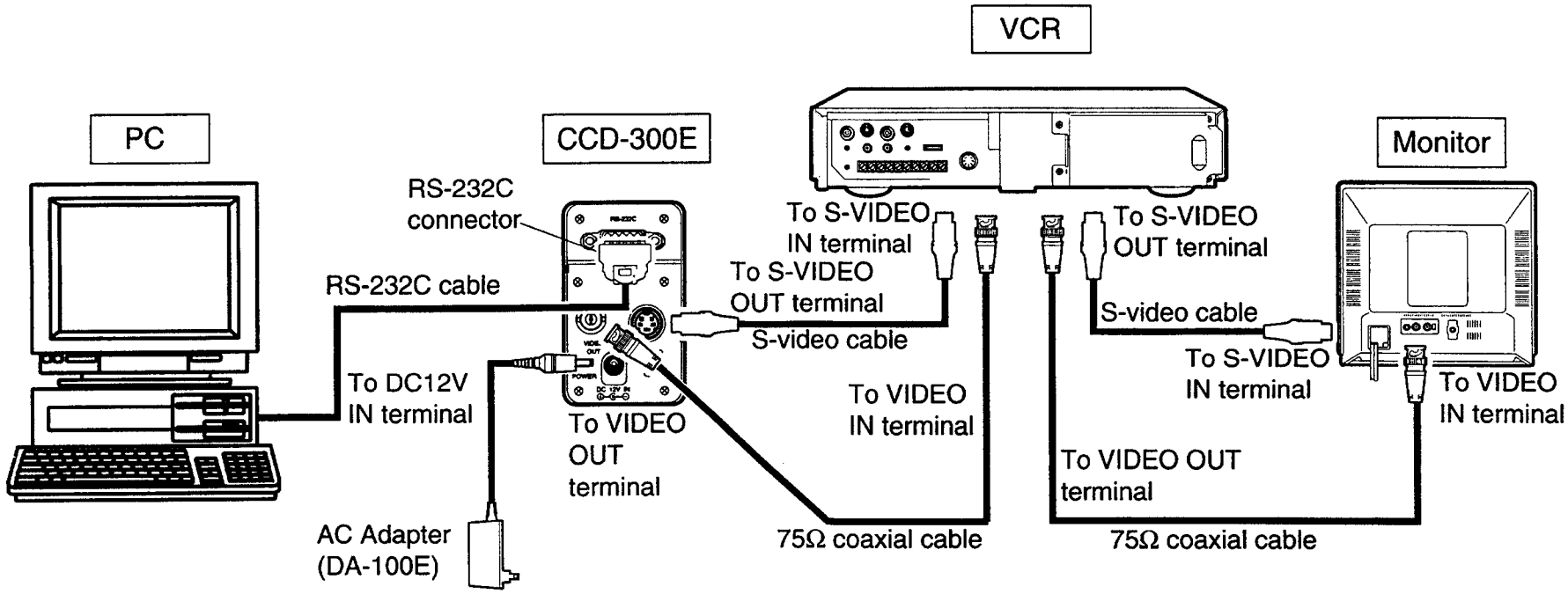


■ When using the S-VIDEO OUT terminal



2. Connection with a VCR

■ When using the VIDEO OUT and the S-VIDEO OUT terminals



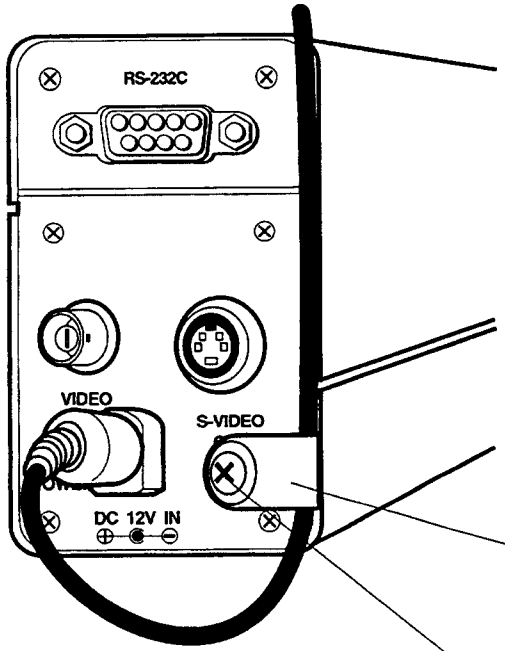
NOTE:

- When connecting the camera with the monitor and the VCR, refer to their operation instructions.
- Refer to "Assembling the BNC Coaxial Connector" on pages 20-21.

3. How to use the clamp and screw

■ Attach the clamp onto the camera with the screw to prevent the power cord plug from becoming disconnected as shown below:

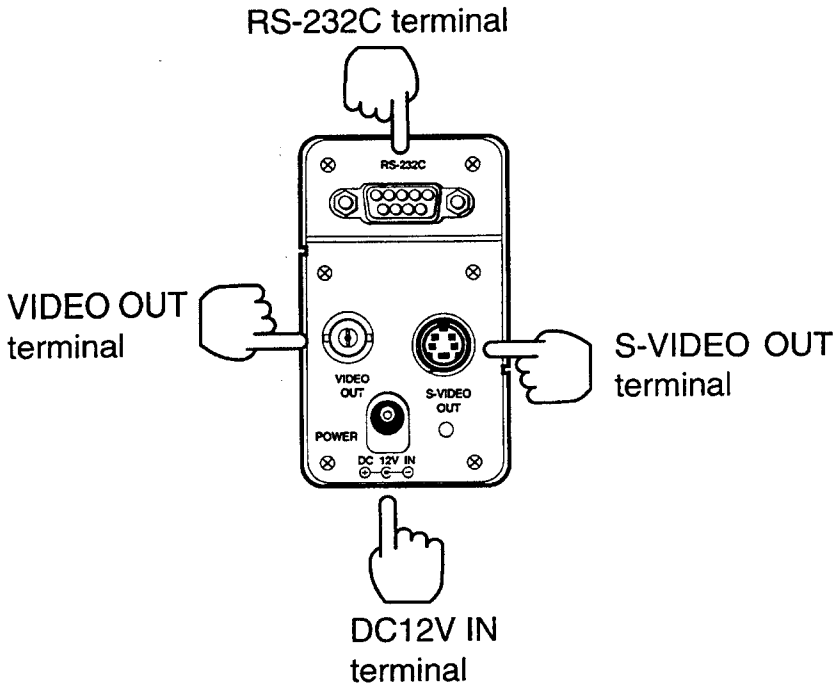
- Use the clamp and screw provided.



1 Put the power cord through the clamp.

2 Fix the clamp on the camera's rear panel with the screw.

5. Basic Settings



1 Connect a video cable from the **VIDEO OUT terminal** or the **S-VIDEO OUT terminal**, to the monitor.

2 Connect the **DC12V IN terminal** with an AC adapter (DA-100E) Plug in the camera.

3 Connect a RS-232C cable between a PC and the RS-232C terminal of this camera.

4 Send a command for a function to be operated.

Initial setting

■ Plug in the camera.
A normal picture appears on the monitor.

The unit automatically returns to the focus position before the unit is turned off. (The settings before this camera is turned off are retained.) Until the setting is completed, the indication of "SET UP" goes on and off on the lower part of the screen.

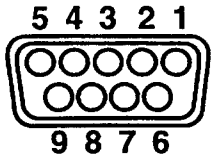
■ The settings except the focus position (e.g., white balance and shutter speed) are also retained.
Change the settings if necessary.

6. RS-232C Interface

This camera can be controlled by using the personal computer equipped with the RS-232C connector.

PHISICAL PROTOCOL OF RS-232C

Pin No.	Signal line names	Meanings	Directions (from camera side)
1	-	NC	-
2	RD	Received data	Input
3	SD	Transmitted data	Output
4	ER	Data terminal ready	Output
5	SG	Signal ground	-
6	DR	Data set ready	Input
7	RS	Request to send	Output
8	CS	Clear to send	Input
9	-	NC	-



DATA LINK

Transmission rate	9600 bps
Data bit length	8 bits
Stop bit length	1 bit
Parity bit	Nil
Control parameter	CR (0DH) or CR+LF (0DH+0AH)

COMMANDS AND FUNCTIONS

No.	Group	Command	Functions	Status
1	ZOOM	ZHT ↵	ZOOM TELE start (High speed)	RC ↵
2		ZHW ↵	ZOOM WIDE start (High speed)	EX15 ↵
3		ZMT ↵	ZOOM TELE start (Low speed)	RC ↵
4		ZMW ↵	ZOOM WIDE start (Low speed)	EX10 ↵
5		ZMS ↵	Zoom Stop	
6	FOCUS	FCA ↵	Focus Auto start	RC ↵
7		FCN ↵	Focus NEAR start	EX11 ↵
8		FCF ↵	Focus FAR start	
9		FCS ↵	Focus stop	
10	WHITE BALANCE	WBA ↵	W.B. Auto start	RC ↵
11		WBI ↵	W.B. INDOOR start	EX03 ↵
12		WBO ↵	W.B. OUTDOOR start	
13		WBL ↵	W.B. lock	
14	WHITE BALANCE ONE-PUSH & LOCK	WLK ↵	WHITE BALANCE ONE-PUSH & LOCK	RC ↵ EX04 ↵
15	SHUTTER SPEED	SSU ↵	S.S. UP (increase)	RC ↵ EX05 ↵
16		SSD ↵	S.S. DOWN (decrease)	
17		SS0 ↵	1/50	
18		SS1 ↵	1/120	
19		SS2 ↵	1/250	
20		SS3 ↵	1/500	
21		SS4 ↵	1/1000	
22		SS5 ↵	1/2000	
23		SS6 ↵	1/10000	

No.	Group	Command	Functions	Status
24	BACK LIGHT	BLU ↵	B.L.UP (brighter)	RC↵ EX06↵
25		BLD ↵	B.L.DOWN (darker)	
26		BL* (**) ↵	B.L.set to * (**) (0, ±1~30)	
27	IRIS	IRU ↵	IRIS UP (brighter)	RC↵ EX07↵
28		IRD ↵	IRIS DOWN (darker)	
29		IR* (**) ↵	IRIS set to * (**) (0, ±1~30)	
30	GAIN	GNU ↵	GAIN UP	RC↵ EX08↵
31		GND ↵	GAIN DOWN	
32		GN* (**) ↵	GAIN set to * (**) (0, ±1~30)	
33	BRIGHT	BRU ↵	BRIGHTNESS up	RC↵ EX09↵
34		BRD ↵	BRIGHTNESS down	
35		BR* (**) ↵	BRIGHTNESS set to * (**) (0, ±1~30)	
36	DETAIL	DTU ↵	DETAIL UP (sharp)	RC↵ EX0A↵
37		DTD ↵	DETAIL DOWN (soft)	
38		DT* (**) ↵	DETAIL set to * (**) (0, ±1~30)	
39	COLOR	CRU ↵	COLOR UP (deep)	RC↵ EX0B↵
40		CRD ↵	COLOR DOWN (light)	
41		CR* (**) ↵	COLOR set to * (**) (0, ±1~30)	
42	TINT	TNU ↵	TINT UP (add green)	RC↵ EX0C↵
43		TND ↵	TINT DOWN (add red)	
44		TN* (**) ↵	TINT set to * (**) (0, ±1~30)	
45	DATA DISPLAY (MENU PAGE)	DS0 ↵	NORMAL SCREEN	RC↵ EX13↵
46		DS2 ↵	MENU 1	
47		DS3 ↵	MENU 2	
48		DS4 ↵	MENU 3	
49		DS5 ↵	MENU 4	
50		DS6 ↵	MENU 5	
51		DS8 ↵	MENU 6	

NOTE: Refer to pages 17 and 18 for the MENU screens.

No.	Group	Command	Functions	Status
52	CHARACTER DISPLAY	CDD ↵	CHAR. DISPLAY disable	RC ↵
53		CDE ↵	CHAR. DISPLAY enable	EX0E ↵
54	CHARACTER ENTRY	CH=******** ↵	Indicates 8 figures of alphabetical or numerical characters	RC ↵ EX14 ↵
55	PRESET DATA EXECUTE ENTRY PRESET DATA	PR* (*) ↵	LOAD PRESET DATA * (*) (1~10)	RC ↵, EX0F ↵ *1
56		PC* (*) ↵	PRESET DATA CLEAR * (*) (1~10)	RC ↵, EX20 ↵
57		PW* (*) ↵	ENTER PRESET DATA * (*) (1~10)	RC ↵, EX1F ↵
58	INQUIRY	ST0 ↵	INFORMATION ON ZOOM	aa, bb ↵
59		ST1 ↵	INFORMATION ON FOCUS	cc, dddd ↵
60		ST2 ↵	PRESET NUMBER	ee ↵
61		ST3 ↵	CAMERA SETTING 1	ff, gg, hh ↵
62		ST4 ↵	CAMERA SETTING 2	ii, jj, kk ↵
63		ST5 ↵	PICTURE ADJUSTMENT	ll, mm, nn, oo ↵

*1 The status "EX0F" for preset execution is sent from the camera after completing preset data execution. It takes approx. 10 seconds to complete the execution and during the time, Max. 5 new commands can be received but not executed.

Details of status in No. 58 to No. 63

Status	Details
aa	00 : Stop 01 : Moving to TELE side 02 : Moving to WIDE side 03 : Moving to high speed TELE side 04 : Moving to high speed WIDE side
bb	Zoom position (00~FF)
cc	00 : Auto 01 : Moving to NEAR side 02 : Moving to FAR side 03 :Stop
dddd	Focus position (0000~FFFF)
ee	Preset No.(at present) - 1

Status	Details	
ff	White balance	00 : Auto 01 : Lock 02 : Outdoor 03 : Indoor
gg	One push & lock	00: Unlocked 02 : Locked
hh	Shutter speed	00~06 (SS0~SS06)
ii	Back light	
jj	Iris	
kk	Gain	
ll	Bright	00~3C : -30~+30
mm	Detail	(1E : 0)
nn	Colour	
oo	Tint	

Error Codes

Status	Meaning of error
ERR1 ↵	Incorrect parameter
ERR2 ↵	Incorrect command
ERR3 ↵	Overflown receiving buffer
ERR4 ↵	Format error
ERR5 ↵	White Balance unlocked

Example

command : Commanding codes from outside to the camera
status : Response codes from the camera to outside

(1) ZOOM

Commands	Status	Meaning
ZMT ↵	RC↵,EX10↵	ZOOM TELE start
ZMS ↵	RC↵,EX10↵	ZOOM stop

(2) FOCUS

Commands	Status	Meaning
FCA ↵	RC↵,EX11↵	AUTO FOCUS start
FCS ↵	RC↵,EX11↵	AUTO FOCUS stop
FCF ↵	RC↵,EX11↵	MANUAL FOCUS FAR start
FCS ↵	RC↵,EX11↵	MANUAL FOCUS stop

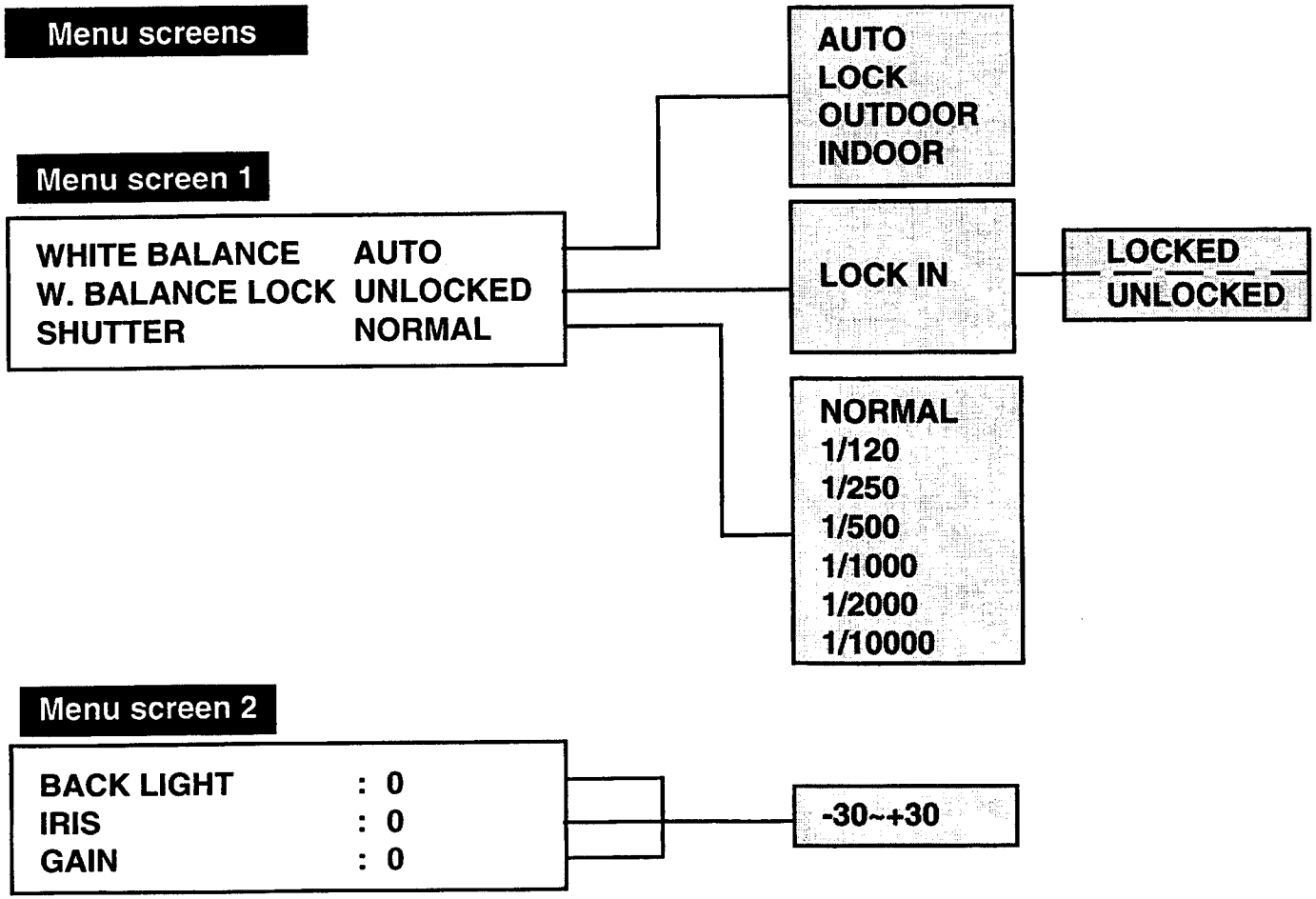
(3) PRESET

Commands	Status	Meaning
ZMT ↵	RC↵,EX10↵	ZOOM TELE start
ZMS ↵	RC↵,EX10↵	ZOOM stop
FCA ↵	RC↵,EX11↵	AUTO FOCUS start
FCS ↵	RC↵,EX11↵	AUTO FOCUS stop
BL+30↵	RC↵,EX06↵	BACK LIGHT +30 set
PW1↵	RC↵,EX1F↵	ENTER PRESET NO. 1

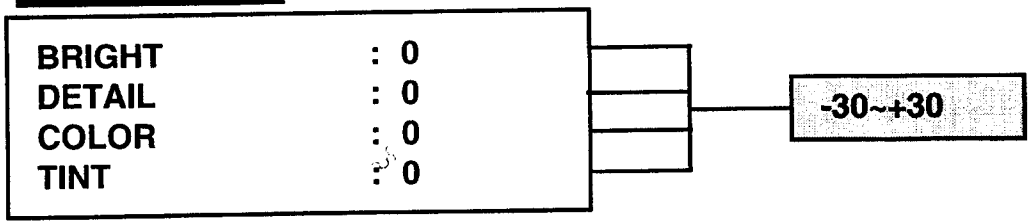
[Caution]

- The command of Stop (ZMS↵ and FCS↵) must be sent after ZOOM and FOCUS operations.
- When a personal computer is turned on or a RS-232C driver soft is started up while the camera is electrified, the camera may not operate correctly against a command. (The camera judges the command first sent as an error.) In this case, send the command "↵ (CR or CR+LF)" before sending the proper command.

7. Menu Screens



Menu screen 3

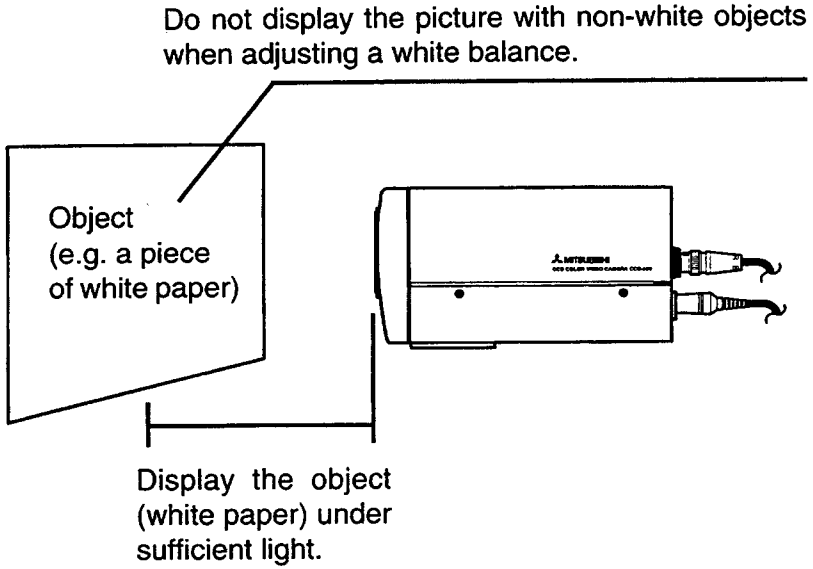


Menu screen 4

Menu screen 5

Menu screen 6

8. White Balance Adjustment


Do not display the picture with non-white objects when adjusting a white balance.
Object
(e.g. a piece of white paper)
Display the object (white paper) under sufficient light.

Under different light the image may seem more blue or red. Therefore, it is necessary to adjust the colour so that white is displayed white and natural tints are precise, depending on the light. This is called "White balance adjustment".
White balance is automatically adjusted in accordance with change of the light if "WHITE BALANCE" is set to "AUTO". However, to make a more exact white balance adjustment or to fix the adjustment in a certain condition, follow the instruction below:

[1] Send the command "DS2 ↵" to display the status of white balance.

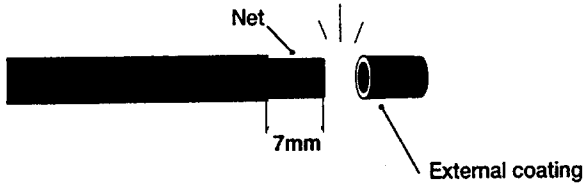
[2] Send the command "WLK ↵".

[3] White balance is automatically adjusted.

- The display of the mode changes from "LOCK IN" to "LOCKED".
  Then, white balance lock operation is completed.

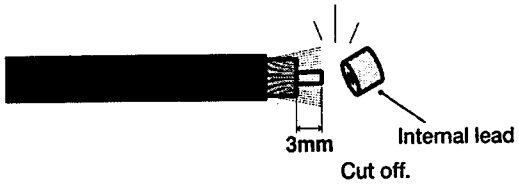
NOTE:
When the object is not white, or when illumination is insufficient, the display changes to "UNLOCKED". This means white balance lock is not performed.

9. Assembling The BNC Coaxial Connector

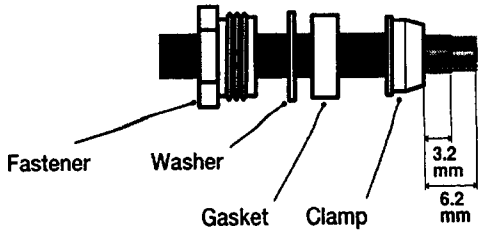


1 Strip the external coating of the BNC coaxial cable at a point 7 mm from the cable end.

NOTE:
- Be careful not to damage the internal net.
- Please use coaxial cable 5C-2V type only.



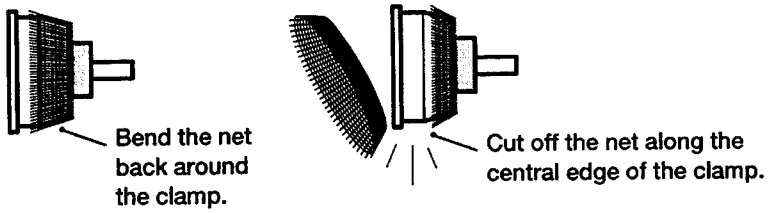
2 Disentangle the net and cut off the internal lead at a point 3 mm from the cable end.



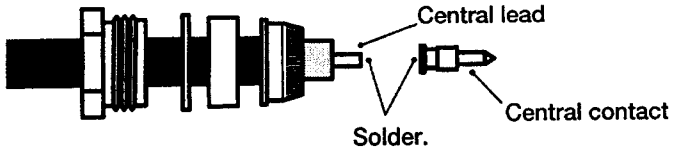
3 Pucker up the net and insert a fastener, a washer, a gasket, and a clamp around the cable.

NOTE:
- Insert each part in the above order.

9. Assembling The BNC Coaxial Connector



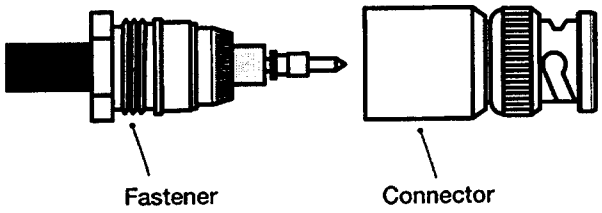
4 Bend the net back around the clamp and then cut off the net along the central edge of the clamp.



5 Insert the central lead into the central contact and solder them.

NOTE:

- When soldering, be sure not to space out between the central lead and the central contact. Also, be careful not to melt the internal lead.



6 Insert the assembled cable into the connector, and fix it with a fastener.

10. Specifications

Model	CCD-300E
Image pickup device	1/3" CCD (total 470,000 pixels)
No. of effective pixels	752H x 582V (440,000 pixels)
Signal system	PAL colour system
Scanning system	625 lines; 2:1 interlace
Scanning frequency	15.625 kHz (H), 50 Hz (V)
Video output	VBS 1.0Vp-p/75Ω (BNC output)
Horizontal resolution	430 TV lines (S-Video output)
S/N ratio	More than 46dB
Minimum illumination	Min. 1 lux / F1.8 (at GAIN+30)
Backlight compensation	Built-in
White balance	AUTO / LOCK / INDOOR / OUTDOOR
Electronic shutter	1/50 - 1/10000 (7 steps)
Closest distance	1cm (widest angle); 80cm (telephoto end)
Lens	Electrically powered 8-power zoom lens F1.8, f = 6.5 - 52mm (Auto iris)
Zoom speed	Two operating speeds from WIDE limit to TELE limit. High speed : 4 sec. Low speed : 7 sec.
Y/C output	S-VIDEO OUT terminal
Sync. system	Internal / External (when using the exclusive controller)
Operating temperature	0°C to 40°C
Safekeeping temperature	-20°C to +60°C
Power supply	DC12V $^{+2}_{0}$V. Ripple voltage less than 500mVp-p (not supplied with the camera)
Power consumption	390 mA
External dimensions	46.2mm(W) x 76mm(H) x 145mm(D) (excluding external connectors) 1.83"(W) x 3"(H) x 5.7"(D)
Weight	490g

Specifications are subject to change without notice.